A COMPARATIVE STUDY OF LABOUR PROGRESS AND DELIVERY OUTCOME AMONG SPONTANEOUS INDUCED PATIENTS

DISSERTATION SUBMITTED IN FULFILLMENT OF THE REGULATIONS FOR THE AWARD OF

M.D. OBSTETRICS AND GYNAECOLOGY

DIVISION OF OBSTETRICS AND GYNAECOLOGY

PSG INSTITUTE OF MEDICAL SCIENCES & RESEARCH

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

GUINDY, CHENNAI, TANILNADU, INDIA

APRIL 2013

Certificate

CERTIFICATE

This is to certify that **Dr. M.K. INDUMATHI** has prepared this dissertation entitled **"A COMPARATIVE STUDY OF LABOUR PROGRESS AND DELIVERY OUTCOME AMONG SPONTANEOUS INDUCED PATIENTS"** under my overall supervision and guidance in the Institute of PSG Institute of Medical Science and Research, Coimbatore in partial fulfilment of the regulations of Tamil Nadu **Dr. M.G.R Medical University** for the award of **M.D. Degree in Obstetrics and Gynaecology**.

Dr. T.V.CHITRA MD DGO., DNB, Professor, Department of Obstetrics and Gynaecology, PSG Institute of Medical Sciences and Research, Coimbatore- 641004	**Dr. SEETHA PANICKER MD DGO., DNB.,** Professor and Head, Department of Obstetrics and Gynaecology, PSG Institute of Medical Sciences and Research, Coimbatore- 641004

Dr. S RAMALINGAM,

Principal,

PSG Institute of Medical Sciences & Research,

Coimbatore – 641004.

Declaration

DECLARATION

I hereby declare that dissertation entitled **"A COMPARATIVE STUDY OF LABOUR PROGRESS AMONG SPONTANEOUS AND INDUCED LABOUR"** was prepared by me under the guidance and supervision of **Dr. T.V. CHITRA MD DGO., DNB.,** PSG Hospitals Coimbatore.

The dissertation is submitted to the Dr. M.G.R. Medical University in partial fulfilment of the University regulations for the award of MD degree in Obstetrics and Gynaecology. This dissertation has not been submitted for the award of any Degree or Diploma.

Acknowledgement

ACKNOWLEDGEMENT

I wish express my sincere thanks and gratitude to my Professor **Dr. T.V.CHITRA MD OG** Department of Obstetrics and Gynaecology, PSG Institute of Medical Science and Research for her guidance and encouragement all along in completing my study. She showed me different ways of approach to study the problem and the need to be persistent to accomplish my goal.

I am extremely thankful **Prof. Dr. Seetha Panicker MD DGO., DNB., Prof. Dr. Reena Abraham MD., DGO.,** Department of Obstetrics and Gynaecology, PSG Institute of Medical Science and Research for their cooperation extended for this study. I wish to record my gratefulness and feeling of indebtedness to them for the support given to me during the period of the study.

I am so grateful to the **Principal Dr. S. Ramalingam and Medical Director Dr. Vimal Kumar Govindan,** PSG Hospitals for permitting me to carry out this study.

I am indebted to all teaching staff, colleagues, interns and all the labour ward staffs of my department, for their valuable suggestions, cooperation and auxiliary attitude. I am extremely thankful to all the patients who were the most important part of my study.

I am obliged to my sister. She was attentive and helped me in organising all the facts during the preparation of this project. I would like to thank my family & my friends for their support in completion of course.

Dr. MK INDUMATHI

Contents

CONTENTS

Introduction

INTRODUCTION

Induction of labour is one of the most common procedures during pregnancy. Data from the National Centre for Health Statistics for the last decade indicate that the rate of labour induction has increased gradually from 9% to 20%. This increase has been noted both at community Hospitals and at the university tertiary care hospitals. Explanations for this jump in the induction rate are complex and multifactorial. Better planning of birth by the physician, patient and her family is the most common reason. Other reasons include the availability of Food and Drug Administration (FDA) approved cervical ripeners, more released attitudes towards marginal or elective inductions and litigious constraints.[1]

Indications for induction of labour have essentially not changed. When concern for the wellbeing of the mother arises, primary indications for induction include active medical disorders, being well beyond the due date and prolonged ruptured membranes. Indication is also justified when the fetus is at risk.

Another general concept is the recognition that induction is associated with increased complications as compared with spontaneous labour. Complications include an increase of chorioamnionitis and increased Caesarean delivery.

Increase in Caesarean delivery rates associated with induction can be due to the uterus being poorly prepared for labour and the physician's preferences regarding the duration of attempt at induction, especially in circumstances of the unripe cervix. The American College of Obstetricians and Gynaecologists practice bulletin "Induction of Labour" states, "Generally induction of labour has merit as a therapeutic option when the benefits of expeditious delivery outweigh the risks of continuing pregnancy. The benefit of labour induction must be weighed against the potential maternal or fetal risks associated with the procedure.

As the induction have both advantages and disadvantages there is a need to study the progress of labour, maternal and fetal outcomes of both spontaneous and induction labour and to compare them.

Aims & Objectives

AIM OF THE STUDY

To compare the progress of labour and its outcome among spontaneous and induced labour.

OBJECTIVES

- To compare the duration and progress of labour in spontaneous and induced labour.
- To compare the maternal outcome.
- To compare foetal outcome.
- To compare the mode of delivery in spontaneous and induced labour.
- To compare the need for oxytocin augmentation.

Literature Review

REVIEW OF LITERATURE

The most common usage of the term review of literature is to refer to that section of a research study in which the researcher describes the linkage between the pre-existing knowledge and the current study. The literature reviewed for the present study has been organized under the following headings.

- The literature related to the history, concept, indication, methods and complications of induced labour.
- The studies related to the intrapartum events, outcomes of the induced labour and outcomes of spontaneous labour.

The literature related to the history, concept, indication, methods and complications of induced labour

Historic Perspectives:

The ability to induce has been of interest to many societies, from the primitive to the ancient to the modern.

Methods of labour induction have been divided into two main types mechanical and chemical. There are various regimens that have been developed

during the course of time in both of these areas. Information regarding primitive obstetrics is minimal. The depictors of primitive life, which have been archaeologically discovered, either in cave paintings or artifacts, were left by men. The birthing room, however was often closed to men and therefore was a mystery to them. Some concept of primitive medium can however be gleaned from observations of Native American practices.

Chemical methods of labour induction used by Native Americans were varied. Rattlesnake's rattles were powered and administered in potion. Another potion was derived from bear claw scrapings. Additional therapies included teas from the blossoms of Indian corn and berries of ground cedar bushes.[2]

Dr. John Williams, a physician to the Green Bay Indian Agency, described the practice of a medicine man keeping before a parturient with a gourd in one hand that he constantly rattled and a pipe in his mouth from which he would blow smoke against her genitalia. It is not known whether this was a method to induce or to augment labour.[2]

An observation of the parite tribe described the practice of having the pregnant women slowly decrease her consumption of food as she approached

term. Physician in Greece, Rome and other contemporary societies wrote about labour induction. Hippocrates recommended two methods. One was nipple stimulation which would lead to uterine contractions and initiation of labour.

Soranus of Ephesus(AD 130) described the need for induction of labour in patients with a small pelvis. The procedures that he recommended included emptying of a full bladder, administering an enema containing a mixture of oil, water and honey; pouring the whites of several eggs into the vagina to soften and relax the cervix.

The Arab physician Abel Casis added to digital dilation a number of instruments that were used for labour induction and labour augmentation.[3]

In the 16th century the French obstetrician Ambrois Pare derived another instrument for mechanically dilating a women's cervix.[4] The major achievement in labour induction was a convention in London in 1756 that addressed for the first time the issue of labour induction in patients who had deformed pelvis. It was done by rupturing the membranes. This was adopted by Dr. Thomas Denman.

James in 1776 suggested that premature labour can be induced by venesection.[5] Dewees, in the early 19th century believed that resistance of circular muscular fibres in uterus could be overcome by bleeding. In 1810 Professor James Hamilton suggested digital seperaion of membranes from lower uterine segment and then high rupture of membranes. This method gained popularity. In 1846, Dr. Kiwisch proposed using a stream of tepid water into the vagina, with labour commencing from 5-6 days. It was abandoned because of severe maternal mortality rates due to uterine rupture. In 1855, sponge tent developed. In 1891, pinard published 100 cases of premature induction of labour.

In the late 19th century and early 20th century cervical dilatation continued to be much in vogue. In 1894 Lee developed a balloon that can be called a colpeurytner. The method of mechanical dilatation of cervix using bags or balloons reached its apogee with the Voorhees meteruynter. This was a rubber covered canvas bag that was deflated, inserted into the cervix and inflated with water.

In the early 20th century ergot, quinine and pituitary extract became the primary medications for the induction of labour. In 1909 William Blair Bell started using pituitary extract, which he called infundibulin to initiate and augment labour. In 1928 Abel and Vincent identified the posterior pituitary hormones, oxytocin and vasopressin. In 1949, the first modern inducing agent, oxytocin was developed by Vigneaud. In 1953 he had synthesized oxytocin and showed that it was identical to natural oxytocin. In 1969, chemists were able to sysnthesize prostaglandians and stated the era of the use of prostaglandins in labour induction.

Induction of Labour

Labour induction is the initiation of uterine contractions prior to their spontaneous onset, leading to cervical dilation and effacement and delivery of the baby.[6] The term generally refers to the third trimester and to last 4 weeks of the second trimester, when fetal survival is the anticipated outcome.

Indications

Labour is indicated when delivery of the fetus will be of benefit to the health of the fetus or mother or both. The indications may be one as below.

Maternal causes

- Pregnancy induced hypertension
- Uncontrolled diabetes
- Abruptio placentae
- Coagulopathy
- Chrioamnionitis
- Premature rupture of membranes
- Cholestasis of pregnancy
- Acute fatty liver of pregnancy
- Acute hydramnios

Fetal Causes

- Intrauterine growth restriction
- Diabetes

- Rh incompatibility
- Unstable lie
- Prolonged pregnancy
- Ruptured membranes

Methods of inducing labour

The decision about which method to use for inducing labour is influenced by a variety of factors including gestation age, maternal health and parity, indication for induction, any primary or secondary pregnancy complications, significant previous labour or delivery complications, fetal health, lie and presentation, cervical condition, maternal preference and obstetric unit facilities.[7]

Cervical condition including form, consistency and dilation appeared to exert the most significant influence on induced labour outcome and in consequence determines the most appropriate method to use. Methods presently used to include those that rely on mechanical stimulation to provoke cervical effacement, dilation and uterine contractility, those that employ pharmacological agents to modify cervical form, those that stimulate uterine

general principle, the simplest inductions those which probably precede the spontaneous onset of labour by a few hours to a day or two, rely on mechanical techniques alone, whereas the most difficult inductions are often managed with pharmacological agents, frequently involving more than one drug and combined with mechanical stimulus.

Methods of cervical ripening and labour induction:[8]

Natural: Breast/nipple stimulation

Membrane stripping

Amniotomy

Acupuncture

Mechanical: Balloon catheters

Laminaria Stems

Synthetic osmotic dilators

Chemical: Can be hormonal/ and non hormonal

Non hormonal preparations:

Herbs blue / black cohosh

Red raspberry leaves

Evening primrose oil

Enemas

Castor oil

Hormonal preperations:

Prostaglandin PGE2 – Increases collagenase and hyaluronidase levels in cervix and increase the submucosal water content. It is available as intra – cervical gel 0.5mg and intra – vaginal gel of 10mg.

Misoprostol PGE1 analogue:

It is a U.S. FDA approved gastro proctective agent for patients con NSAIDS.

Can be used orally and intravaginally.

Oxyrocin: An octapeptide simulates natural labour has a half life of 2-7 minutes. Binds to oxytocin receptors and increases calcium release from

endoplasmic reticulum, increases production of prostaglandins from deciduas to bring uterine contractions.

- Mifipristone
- Relaxin
- Oestrogen
- Nitric oxide donors
- Foetal fibronectin

Complications of Induced Labour

There are a number of potential hazards for both mother and fetus/neonate from incuction of labour, either as a result of initialting labour before spontaneous onset, or as a consequence of the method of induction used.[9] Among the hazards are those included below

Uterine hyperstimulation

It is iatrogenic and describes an inappropriate reaction of the myometrium to exogenous oxytocics, including oxytocin and prostaglandins, either

because of myometrial hypersensivitiy or drug over dosage. It can result in uterine hypertonus or tachysystole. Both cause foetal distress.

Failed Induction:

There is no universally accepted definition for failed induction. It should perhaps be reserved for these cases where the cervix does not dilate beyond 3cm despite adequate and appropriate induction and oxytocic stimulation over a reasonable period of time.

Hyponatremia:

This may occur as a consequence of intravenous oxytocic infusion infusion in dilute solutions of saline. This may result in maternal fluid retention, electrolyte derangement, coma and death, and similar derangements to neonatal biochemistry leading to neonatal seizures.

Fetal distress/hypoxia

Fetal distress should be expected to occur more frequently during induced than spontaneous labour as a result of hyperstimulation, cored prolapsed and abruption placentae.

Cord proplase:

This occurs most commonly with low amniotomy or ones induced with a high presenting part managed with an oxytocic to stimulate labour.

Abruptio placenta:

There has been a suggestion that prostaglandin may predispose to this complication when used for labour induction.[10]

Uterine rupture:

Although extremely uncommon in multipara this complication may occur in any labour whether spontaneous, induced with oxytocin, PGE1 or PGE2. It is a particular risk in multipara of high parity and those previously by caesarean section.

Inadvertant preterm delivery:

This is a risk with any induction, whichever method is used. With widespread use of ultrasound examination in early pregnancy this incidence has declined.

Hyperbilirubinemia:

The incidence of neonatal hyperbilirubinemia is increased following induction with intravenous ocytocin compared with prostaglandin inductions and spontaneous labour.[11]

Hypotonic uterine postpartum haemorrhage:

It is more commonly encountered following induced labour.

The studies related to intrapartum events, outcomes of induced labour and outcome of sponaneous labour.

Helen et al studied the effect of sweeping the membranes in pregnancies longer than 40 weeks and concluded that is a safe, useful procedure which results in a reduced incidence of postmature pregnancies and subsequent reduction in labour induction rate.[12]

S. Arul Kumaran et al analysed th uterine activity of nulliparous women in labour and compared it with that of multiparous women and stated that less uterine activity is required to effect normal vaginal delivery in multiparous women than in nulliparous women. They also found that uterine activity until 8

cm cervical dilation with a steeper rise to peak values before the second stage is reached.[13]

After studying 847 multigravid women in spontaneous labour Gibb et al concluded that 88% of patient had normal first stage progress and the caesarean section rate was 0.5% the remaining 12% had dysfunctional labour which can be corrected with intravenous oxytocic in 85% and the caesarean section rate was 1.2%.[14]

Janet et al used recombinant human relaxin as a cervical ripening agent in the dosage of 1-4 mg administered as an intravaginal gel and found that it had no effect as a cervical ripening agent and suggested that it should be tried in higher dosage and by intravenous route.[15]

Regine Ahner and co-workers studied that the assessment of fetal fibronectin content in cervicovaginal secretions, constitutes a viable instrument in the decicion making process proceeding induction of labour. The presence of fetal fibronectin favours induction of labour and its success in terms of precision and objectivity.[16]

Joseph et al studied 11 patients in whom labour was augmented with oxytocin and stated that therapeutic regimens for the induction or augmentation of labour ≥36 week's gestation should be based on the fact that both the plasma concentration and the myometrial response to a pharmacologic dose of oxytocin require about 40 minutes achieving their maximum. They also stated that the required rates of oxytocin degradation by natural plasma in vitro have no pharmacologic significance or regimens designed for use in the induction or augmentation of term labour.[17]

Andrew et al studied 1773 pregnancies who received oxytocin for labour augmentation or labour induction and confirmed the suspicion of clinicians that cervical dilatation, gestational age, and parity influence pregnancy response to oxytocin. They concluded that the knowledge of cervical dilatation, gestational age, parity or body surface area offered practical predictive advantage in determining the dose response to oxytocin used for labour stimulation. Until the pharmacometric of oxytocin are better understood each pregnant women receiving oxytocin for labour stimulation will continue to represent an individual assay.[18]

Ann et al compared the patterns of uterine activity in women who were undergoing pre-induction cervical ripening with prostaglandin E2 either as a gel or controlled release pessary and concluded that low amplitude, high frequency uterine contractions began with either method but sustained, high amplitude contractions primarily with the pessary.[19]

Fereshteh et al after analyzing 53 patients concluded that latent phase and total labour duration were significantly associated with the presence of cervical wedging and decreased cervical length noted on transvaginal ultrasonography and may be useful in the evaluation of induction candidates.[20]

Wing et al analysed labour induced in 276 patients with either misoprostol or PGE2 gel and reported that misoprostol appears to be as affective as PGE2 gel for cervical ripening and labour induction and he complications associated with prostaglandin administration were not statistically significant between the two groups.[21]

Mackenze et al studied that PGE2 used to ripen the unfavourable cervix leads to increased concentration of prostaglandin and metabolites in fetal

circulation and so repeated and prolonged treatment may have detrimental effect on cardiovascular homeostasis.[22]

Geraldine et al conducted a prospective study of 103 patients undergoing labour induction for presence of fetal fibronectin and reported that fetal fibronectin is as good as the modified Bishop score as an index of the ease with which induction of labour may be preformed and this would reflect the proximity of onset of labour.[23]

Jagani et al analysed the data on 51women who had dysfunctional labour and suggested that he variables of pelvic measurements and birth weight do not provide a predictive tool for delivery outcome.[24]

Ritta et al measured the levels of oxytocin in women in spontaneous labour at various stages and concluded that the pulses of oxytocin observed at increasing frequency during spontaneous labour are of physiological significance and provide evidence for the participation of oxytocin in the onset and maintenance of spontaneous labour.[25]

Varakshi et al conducted a trial on women induced with PGE1 and PGE2 and compared them and reported that PGE1 is more effective than intra cervical PGE2 in bringing aboutlabour and delivery.[26]

Stampe et al ater having studied 103 patients who received either PGE2 intra cervical or buccal desmoxytocin as cervical ripeners and stated that PGE2 gel administered intra cervically is particularly well suited for the induction of labour with patient unripe cervical state because of its combined contraction inducing and cervical ripening properties.[27]

Brindley et al after analysing the indication, various methods of induction came to a conclusion that medical control of labour is often necessary in modern obstetrics. The status of cervix dictates the methods of induction and influences its success. He described the various methods of induction of labor, augmentation of labor, the number of doses that can be used and the methods of monitoring the mother and fetus.[28]

Jeffry et al analysed 3715 term nulliparous deliveries and concluded that older women are at higher risk for caesarean delivery regarding whether labour

is spontaneous or induced and it was mainly done for failure to progress and fetal distress.[29]

Barbare et al analysed the temporal changes in rates and reasons for induction of labour and stated that the rate of medical labour induction increased from 12.9 – 25.8% in 5 years and induction also changed with a 2 fold increase in induction for post date gestation, a 23 fold increase in induction for macrosomia, 15 fold increase in elective induction and a 22 fold decline in induction for PROM.[30]

Sascha Dublin et al conducted a cohort study of 2886 women in induced labour and 9648 women with spontaneous labour who were delivered at 37 – 41 weeks, all without identified indications for induction and reported that induced labour was associated with increased likelihood of LSCS for nulliparous but not multiparous women and with modest increase in the incidence of instruments delivery and shoulder dystocia for all women.[31]

Bishop devised a cervical scoring system for nulliparous patient with planned elective induction of labour in which 0-3 point are given of each of five factors.[32]

He determined that when the total score was at least 9, the likelihood of vaginal delivery after labour induction was similar to that observed in patient with spontaneous onset of labour.

Calkins observed a series of 1250 consecutive labours and reported that cervical resistance is beyond question a factor of great importance in determining the length of the first stage of labour. He also noted assessing cervical softness and labour intensity on scales of 1 to 5 seemed to have clinical merit.[33]

Burnett in 1966 suggested potential modification of Bishops initial system. He recommended that each of the five factors be scored from 0-2 point rather than from 0-3 point range recommended for some factors in the original Bishops system.[35]

Prysak et al studied that elective induction commonly practised safe and efficacious, Cesarean delivery is increased significantly by nulliparity and or an unfavourable cervix among other factors but not by induction itself.[35]

Dean et al observed that large variations existed in labour inductions across hospital types and those inductions increased caesarean delivery rates among nulliparous women whereas no increase was seen among parous women with no previous caesarean delivery.[36]

James et al observed that patients with induced labor had short 1st stage. Meconium staining was found more often in spontaneous labor than induced labor. When compared with spontaneous labor elective induction of labor at term does not appear to pose an increased risk to mother or her fetus in a carefully selected patient population.[37]

Arthur et al studied that elective induction in nulliparous women increased the rate of caesarean section and increased maternal age and increased birth weight increased the rate of caesarean deliveries.[39]

Seyb et al analysed the increased risk of caesarean delivery in nulliparous women who underwent induction and advised avoidance of induction in settings of unproved benefits to reduce primary caesarean delivery rates.

Yeast et al reviewed 7001 consecutive inductions and stated that the use of induction methods has significantly increased and more than 40% of patients needed induction. Caesarean delivery remains low in this facility inspite of marked increase in operative delivery for nulliparous women who underwent induction.[40]

Leich et al observed the various indications for caesarean delivery and suggested that there has been a lowering in the overall threshold concerning the decisions to carry out a caesarean section rather than changes in obstetric management.

According to cross sectional study by World Health Organization global survey in Latin American countries on maternal and perinatal health in 2004 – 2005.[41]

Elective induction of labour has also been associated with a greater need for anaesthesia which interfere with the natural process of delivery even in absence of maternal complications as other adhere situations and also carries inherent risks and increased costs.

There was no difference between the two groups with respect to the 5th minute APGAR score even after adjustment for all predictor variables. This finding corroborates reports from various other authors. In the current study elective induction did not show a significant association with low birth weight. Finally elective induction in this study is associated with late initiation of breast feeding.

Women who had induced labour had increased rates of caesarean section and more importantly of hysterectomy. Therefore caution should be exercised when inducing labour without any medical indication. Since no clear benefits outweigh the associated risk of an adverse maternal outcome.

According to Glantz Jc in Newyork. Odd ratios for epidual anaesthesia, caesarean delivery and diagnosis of Nonreassuring fetal heart rate patterns were independently increased following elective induction; odd ratios for CPD, instrumental delivery and adverse neonatal outcome were not. Maternal length of stay was 0.34 days longer with induction than with spontaneous labour ($p<0.0001$). Slightly more induced labour ended before midnight.[42]

According to retrospective study by Macer et al; Epidural anaesthesia was used in 83.8% of patients in the induction group whereas 55.7% in the spontaneous group. Patients with induced labour had a shorter 1st stage of labour. Meconium staining was found significantly more often in the spontaneous group than in the induced (16.2% vs 6.7%). This contributed to greater rate of neonatal consultations in the spontaneous labour group. Although caesarean section rates between the 2 group were similar nulliparous patients in the induction group with an estimated Bishop score of less than or equal to 5 had a 50% caesarean section rate. Iatrogenic pre maternity was not encountered. No differences existed between the 2 groups with respect to intra partum maternal complications, fetal complications or postpartum complications.

When compared with spontaneous labour, elective induction of labour at term does not appear to pose an increased risk to the mother and her fetus in a carefully selected patient population. However elective induction of labour in a nulliparous patient with an unfavourable cervix should be discouraged.[43]

Materials and Methods

MATERIALS AND METHODS

- The study was conducted in the department of Obstetrics and Gynaecology, PSG Hospitals, Coimbatore from July 2011 to December 2011.

STUDY DESIGN

Prospective study

STUDY POPULATION

Study group consisted of two groups. These groups constituted of pregnant women at term admitted to PSG Hospitals in spontaneous labour and pregnant women admitted for induction of labour for either medical or obstetric reasons.

SELECTION CRITERIA

- Singleton Pregnancy
- Vertex Presentation
- Completed 37 weeks
- Spontaneous true labor pain

- Need for induction of labor
- Reactive fetal heart rate pattern

EXCLUSION CRITERIA

- Multiple gestation
- Breech and other abnormal presentation
- Placenta previa
- Abruptio placenta
- Pre term
- Previous LSCS
- Medical Complications of pregnancy where delivery is urgent
- Cervical dilatation more than 7 on admission
- Severe oligohydramnios
- Cord prolapse
- No trial of labour

METHODOLOGY

Comparative study involving women in spontaneous labour versus those induced with PGE2 gel and PGE1.

Basic assessment for risk factors is done in antenatal patients with spontaneous onset of labour and if the patient comes under uncomplicated term gestation she is included in the study. Women were included in the study group if their gestational age was atleast 37 weeks at admission to labour, carried a singleton pregnancy in vertex presentation and had an reactive fetal heart rate pattern.

Excluded women in pre-term labour with other obstetric and medical complication requiring emergency delivery. Detailed antenatal history followed by basic pelvic assessment is done and reactive FHR pattern is assessed. Progress of labour is monitored with modified WHO partograph. The need for further acceleration of labour is decided based on the partograph.

All consecutive patients who entered into spontaneous labour were included in the study similarly after exclusion all consecutive women admitted for induction was chosen. After obtaining informed concern they were induced with PGE2 gel or PGE1.

Spontaneous Labour

Labour that begins naturally or spontaneously is when contraction start on their own. During spontaneous labour, the contractions grow and intensify at their own phase. The question of how labour starts is still not completely answered.

Induction of Labour

Induction of labour means initiation of uterine contractions (after fetal viability) for the purpose of vaginal delivery.

Augmentation of Labour

Augmentation is the process of stimulation of uterine contraction that are already present but found to be inadequate.

Active management of Labour

- Women is admitted in the labour ward only after the diagnosis of labour (regular painful uterine contractions with cervical effacement).
- Partographic monitoring of labour.
- ARM with conformation of labour.
- Oxytocin augmentation if cervical dilatation is less 11cm per hour epidural analgesia if needed
- Fetal monitoring by intermittent auscultation or by continuous electronic monitoring.

Once patient come with spontaneous labour initial PV is done and Bishop Score is assessed. After an enema, patient is allowed to progress on her own. Next PV is repeated after 4 hours or when there is draining. Once the patient enters into active phase labour is monitored with partograph. If a repeat PV examination finding crosses the alert line, labour is augmented with syntocinon. Once the patient enters into active labour, active management of labour is done.

In the control group following a basic pelvic assessment (to rule out cephalopelvic disproportion), non-stress test is done and bishop score is assessed. If the score is less than 4 PGE2 gel is applied intracervically. The patient is reassessed after spontaneous onset of labour or draining PV or after 6 hours – whichever is earliest.

The method of further induction is decided and implemented according to bishop score. If Bishop Score is unfavourable then another dose of gel was used. Maximum 3 doses of gel were used at 6 hours interval. Still if score was unfavourable then misoprostol tablets 25 µg was kept to maximum of 3 doses 4 hours apart.

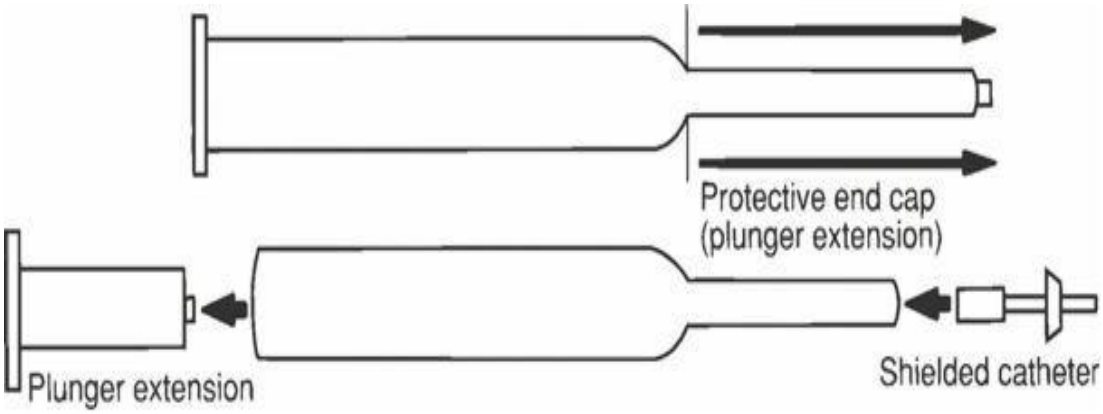
A post induction Bishop Score of 6 is favourable. Labour was accelerated with oxytocin and artificial rupture of membranes according to per vaginal functions. In the interval period fetal heart rate monitoring is done to assess the fetal wellbeing.

For this study we compared duration and progress of labour in latent and active phase by whether labour was induced, spontaneous or augmented as determined by chart review.

PGE2 gel placement

Under aseptic precaution prostaglandin gel 0.5mg is instilled endocervically.

Gel insertion device



OUTCOME MEASURES

- Duration of latent and active phase.
- Need for augmentation
- Mode of delivery
- Side effects
- Uterine hyperstimulation
- APGAR score at birth and 5 mins

Both labouring was monitored by partograph using Bishop System of cervical scoring.

BISHOP SYSTEM OF CERVICAL SCORING

Assessment Score	Dilatation (cm)	Effacement (%)	FSetal Station	Consistency	Position
0	0	0 – 30	-3	Firm	Posterior
1	1 – 2	40 – 50	-2	Medium	Mid
2	3 – 4	60 – 80	-1,0	Soft	Anterior
3	5 – 6	90 – 100	+1,+2,+3	-	-

Note: Add the score for each of the clinical assessment. If the total score is greater than 8, the success of induction approaches that of spontaneous labour.

Duration

The duration of latent phase and active phase were compared between these two groups and the difference between the two was analysed.

SIDE EFFECTS

Side effects of induced labour was analysed

Complications like fever, nausea, vomiting, diarrhoea, uterine hyper stimulation, uterine rupture was noted.

Meconium

The colours of liquor in both the study groups were chartered out for analysis.

Mode of Delivery

Gestational age at which patients entered into spontaneous and induced labour, the mode of delivery in these patients was noted. Caesarean section rate, need for instrumental delivery of both groups compared and rate of vaginal delivery found. The rate of post partum haemorrhage was noted.

PERINATAL OUTCOME

Perinatal outcome is assessed by APGAR score

FeaturSes Evaluated	0 points	1 point	2 points
Heart rate	None	< 100 beats per minute	More than 100 beats per minute
Breathing	Absent	Irregular, shallow, gasping Breaths, weak cry.	Full breath , strong cry
Muscle tone	Limp	Weak, some movement	Actively moving arms and legs
Reflexes/irritability	No reflexes	Grimace	Cry or active avoidance
Skin colour	Pale or blue All over	Pale or blue in hands and feet.	Completely pink

Note: Maximum score is 10 minimum score is 0.

NEW BORN ASSESSMENT OF APGAR SCORE

Results

RESULTS

During the study period a total of 300 patients were included in the study. 150 patients in spontaneous onset of labour and 150 patients in induced labour.

	Frequency	Percent
Spontaneous Labour	150	50.0
Induction Labour	150	50.0
Total	300	100.0

Table 1: Distribution of labour according to mode of onset

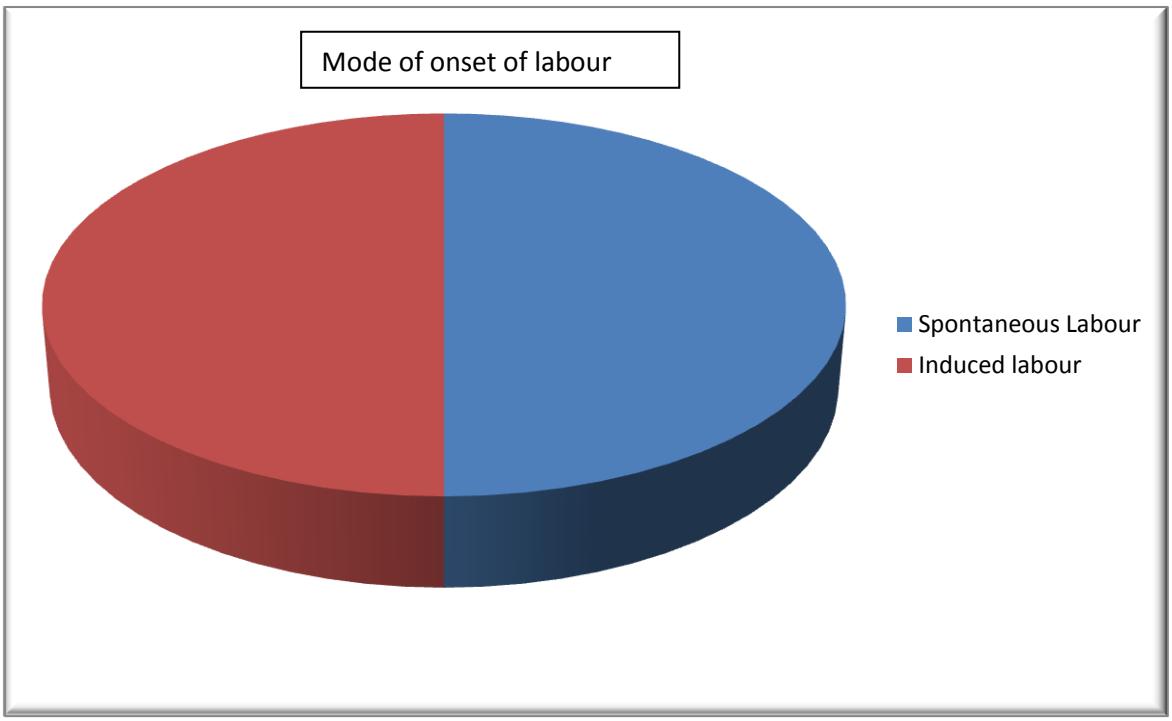


Table 2: Mode of onset PARITY cross tabulation

			PARITY		
			Primi	Multi	Total
mode of onset	Spontaneous Labour	No	100	50	150
		%	66.7%	33.3%	100.0%
	Induction Labour	No	110	40	150
		%	73.3%	26.7%	100.0%
Total		No	210	90	300
		%	70.0%	30.0%	100.0%

Graph 1: Mode of onset

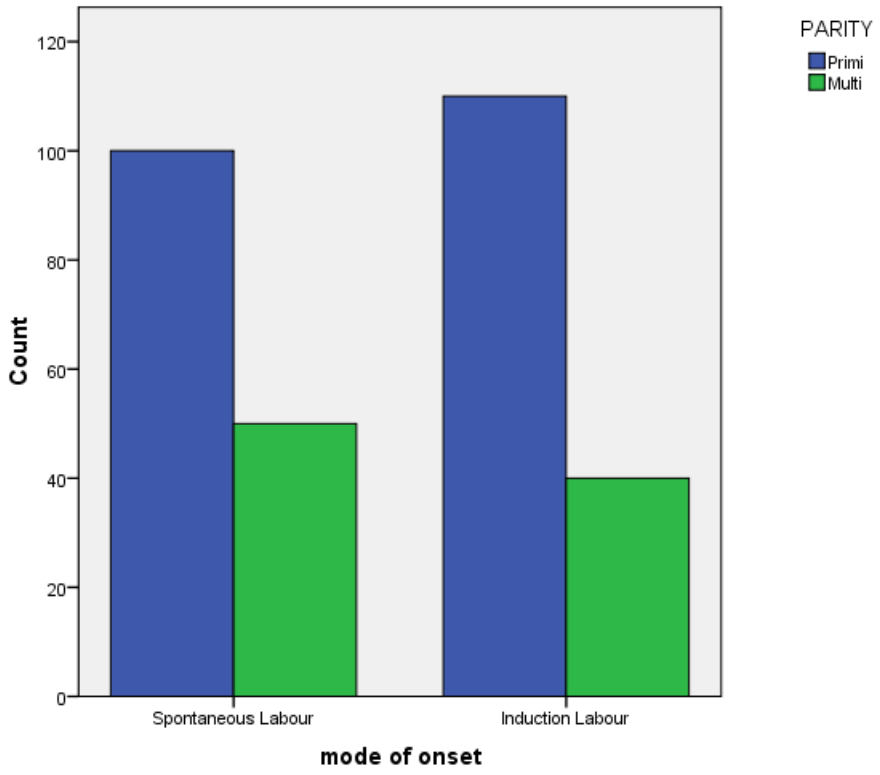


Table 3: Age distribution of Women

mode of onset	PARITY	Mean	N	Std. Deviation	Minimum	Maximum
Spontaneous Labour	Primi	24.42	100	4.132	17	36
	Multi	25.50	50	3.052	19	33
	Total	24.78	150	3.830	17	36
Induction Labour	Primi	24.50	110	3.930	18	35
	Multi	24.08	40	3.612	19	31
	Total	24.39	150	3.840	18	35
Total	Primi	24.46	210	4.018	17	36
	Multi	24.87	90	3.369	19	33
	Total	24.58	300	3.834	17	36

$p = 0.789$

$sig > 0.05$

Test used= ANOVA

The result states that there is no significant different in age group between spontaneous labour patients and induced patients. The age is more or less in the same category.

Table 4: Gestational Age in weeks

mode of onset	PARITY	Mean	N	Std. Deviation	Minimum	Maximum
Spontaneous Labour	Primi	38.561	100	.9005	36.2	40.2
	Multi	38.722	50	.9305	36.3	40.2
	Total	38.615	150	.9107	36.2	40.2
Induction Labour	Primi	38.855	110	1.2204	36.4	42.0
	Multi	39.448	40	.9793	37.0	42.3
	Total	39.013	150	1.1872	36.4	42.3

p value = 10.649

Test used = ANOVA

The gestational age at which patients were induced were higher than patients with spontaneous labour however the difference was very low and is statistically not significant.

Table 5: Mode of Delivery

mode of onset				mode of delivery			
				Emergency LSCS	NVD	vaccum delivery	Total
Spontaneous Labour	PARITY	Primi	No	1	94	5	100
			%	1.0%	94.0%	5.0%	100.0%
		Multi	No	1	49	0	50
			%	2.0%	98.0%	.0%	100.0%
	Total		No	2	143	5	150
			%	1.3%	95.3%	3.3%	100.0%
Induction Labour	PARITY	Primi	No	30	66	14	110
			%	27.3%	60.0%	12.7%	100.0%
		Multi	No	5	27	8	40
			%	12.5%	67.5%	20.0%	100.0%
	Total		No	35	93	22	150
			%	23.3%	62.0%	14.7%	100.0%

P value = <0.05

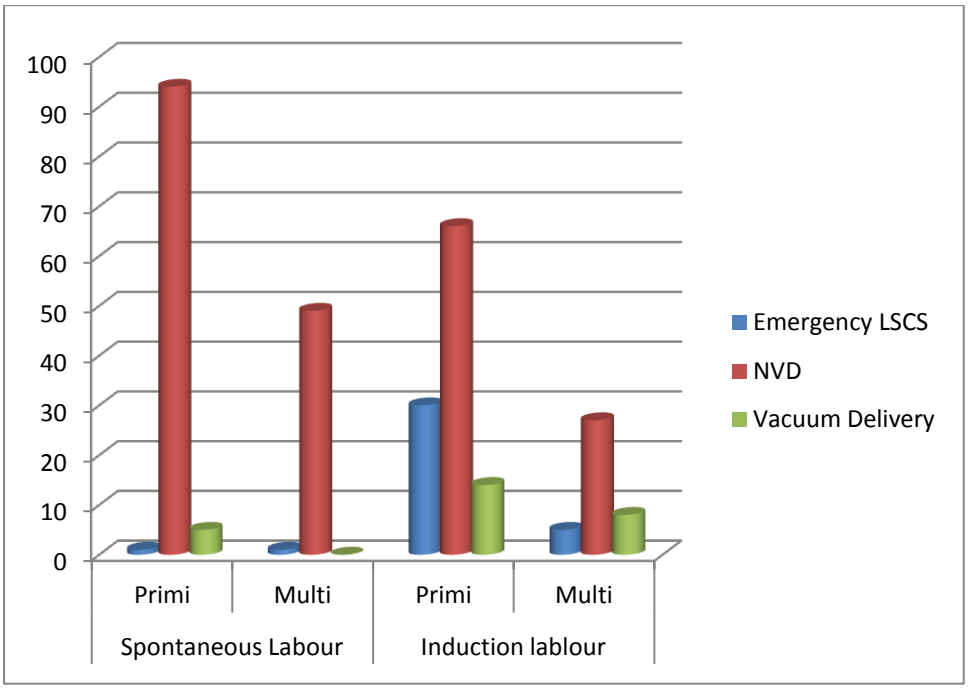
Percentage of caesarean delivery among induced women is 23.3%.

Percentage of caesarean delivery among women in spontaneous labour is 1.3%

Table 6: Indication for Caesarean delivery

Indication	Spontaneous		Induced	
	No	%	No	%
Failed induction	-	-	15	10
Fetal Distress	2	1.3%	7	4.6
Meconium stained liquor	-	-	8	5.3
Prolonged PROM	-	-	2	1.3
Deep transverse arrest	-	-	2	1,3

Graph 2: Mode of delivery



It is well evident that women in spontaneous labour had higher chance of normal vaginal delivery than women in induced group.

Spontaneous Labour = 98.7% normal delivery and 1.3 % caesarean delivery.

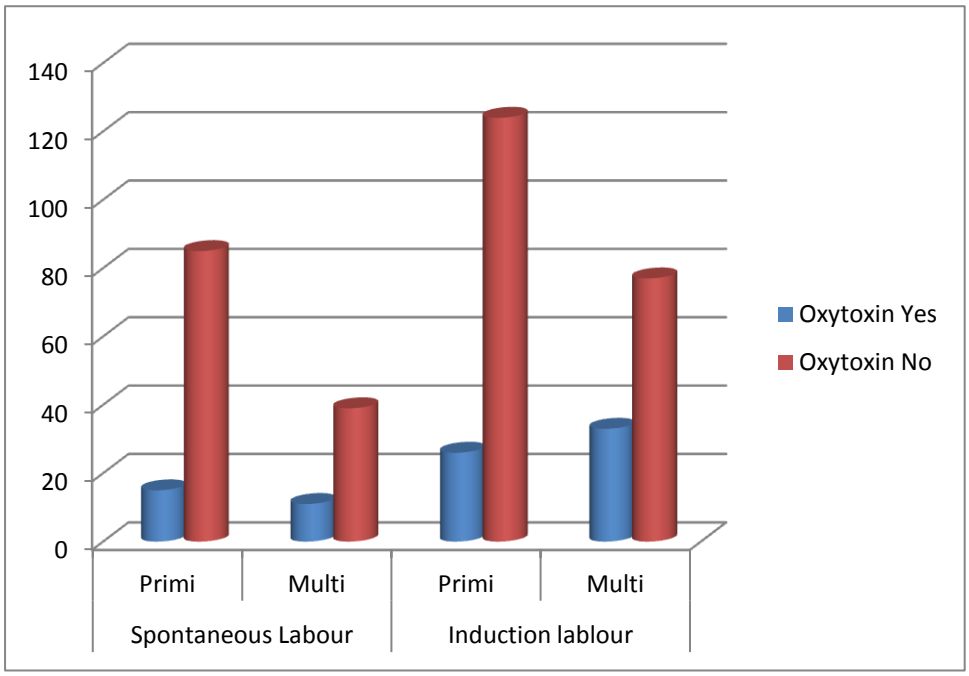
Induced labour = 76.7% normal delivery and 23.3% caesarean delivery.

Table 7: Acceleration with Oxytocin

mode of onset				Oxytocin		
				Yes	No	Total
Spontaneous Labour	PARITY	Primi	No	15	85	100
			%	15.0%	85.0%	100.0%
		Multi	No	11	39	50
			%	22.0%	78.0%	100.0%
	Total		No	26	124	150
			%	17.3%	82.7%	100.0%
Induction Labour	PARITY	Primi	No	33	77	110
			%	30.0%	70.0%	100.0%
		Multi	No	13	27	40
			%	32.5%	67.5%	100.0%
	Total		No	46	104	150
			%	30.7%	69.3%	100.0%

Women in induced labour require higher oxytocin acceleration than women in spontaneous labour.

Graph 3: Acceleration with oxytocin



Women in induced labour require higher oxytocin acceleration than women in spontaneous labour.

Table 8: Duration of Latent Phase in hours

mode of onset	PARITY	Mean	N	Std. Deviation	Minimum	Maximum
Spontaneous Labour	Primi	5.1145	100	2.64002	1.00	14.00
	Multi	4.4590	50	2.12338	1.00	10.00
	Total	4.8960	150	2.49194	1.00	14.00
Induction Labour	Primi	11.7206	102	7.46794	1.00	48.00
	Multi	10.0986	37	6.02728	2.00	24.00
	Total	11.2888	139	7.12824	1.00	48.00

p value < 0.01

Test used = ANOVA

The mean duration of latent phase of labour is more in induced group (11.2), the mean duration of latent phase of labour in spontaneous group is 4.8 with the significant p value of less than 0.01.

Table 9: Active phase of spontaneous and induced labour

mode of onset	PARITY	cervical dilation	Mean	N	Std. Deviation	Minimum	Maximum
Spontaneous Labour	Primi	3.00	3.0656	16	1.26659	1.50	7.00
		4.00	2.3091	11	1.22899	.45	4.45
		5.00	1.9611	9	.53138	1.00	3.00
		6 & more than 6	2.2583	30	1.47742	.30	6.00
		Total	2.4220	66	1.32555	.30	7.00
	Multi	3.00	2.6500	4	.92556	2.00	4.00
		4.00	2.0857	7	.78619	1.00	3.50
		5.00	2.5000	1	.	2.50	2.50
		6 & more than 6	2.5441	17	1.48112	.10	6.00
		Total	2.4466	29	1.23375	.10	6.00
	Total	3.00	2.9825	20	1.19619	1.50	7.00
		4.00	2.2222	18	1.05791	.45	4.45
		5.00	2.0150	10	.52918	1.00	3.00
		6 & more than 6	2.3617	47	1.46915	.10	6.00
		Total	2.4295	95	1.29172	.10	7.00
Induction Labour	Primi	3.00	4.1250	32	2.69408	1.00	10.00
		4.00	3.6706	17	2.40981	1.40	10.00
		5.00	2.4444	9	1.99130	1.00	7.50
		6 & more than 6	2.4000	15	1.24212	1.00	4.50
		Total	3.4575	73	2.39292	1.00	10.00
	Multi	3.00	6.0000	12	3.81385	2.00	16.00
		4.00	3.6500	6	2.28364	1.00	7.00
		5.00	1.2500	2	.35355	1.00	1.50
		6 & more than 6	2.9364	11	2.38213	.30	8.00
		Total	4.1516	31	3.25851	.30	16.00
	Total	3.00	4.6364	44	3.10918	1.00	16.00
		4.00	3.6652	23	2.32567	1.00	10.00
		5.00	2.2273	11	1.84883	1.00	7.50
		6 & more than 6	2.6269	26	1.79077	.30	8.00
		Total	3.6644	104	2.68274	.30	16.00

P value < 0.01

Test used = ANOVA

In patients with spontaneous labour the duration of active phase is shorter when compared to induced labour.

Table 10: Maternal complications occurring during labour

Complications	**Spontaneous Group**	**Induced Group**
Fever	0	0
Vomiting	10(6.6%)	14(9.3%)
Hyper stimulation	3(0.2%)	5(3.3%)

Table 11: Postpartum Haemorrhage

PPH	**Spontaneous Group**	**Induced Group**
Atonic	2(1.3%)	5(3.3%)
Traumatic	-	-

Table 12: Birth weight of Babies

mode of onset	PARITY	Mean	N	Std. Deviation	Minimum	Maximum
Spontaneous Labour	Primi	2.8991	99	.39830	2.10	4.00
	Multi	3.0274	50	.31626	2.10	3.80
	Total	2.9421	149	.37664	2.10	4.00
Induction Labour	Primi	2.8385	109	.48479	1.93	4.35
	Multi	2.9697	38	.39688	2.10	3.57
	Total	2.8724	147	.46593	1.93	4.35

P value > 0.05

Test used = ANOVA

The mean birth weights of babies are statistically not significant between two groups.

Table 13: APGAR SCORE 1 minute

APGAR Score at 1minute	**Spontaneous Labour**		**Induced Labour**	
	No	%	No	%
>8	141	94	140	93.3
<8	9	6	10	6.6

The Apgar scores of the babies at 1 minute in the spontaneous group was found to be similar to that of induced group (Apgar<8 in spontaneous – 94% in induced – 93.3%).

The Apgar scores of the babies at 1 minute in the spontaneous group was found to be similar to that of induced group (Apgar>8 in spontaneous – 6% in induced – 6.6%).

Table 14: APGAR SCORE 5 minute

APGAR Score at 5 minute	**Spontaneous Labour**		**Induced Labour**	
	No	%	No	%
>8	148	98.6	146	97.3
<8	2	1.3	4	2.6

The Apgar scores of the babies at 5 minutes in the spontaneous group was found to be better than the induced group (Apgar>8 in spontaneous – 98.6% in induced – 97.3%).

The Apgar scores of the babies at 5 minutes in the spontaneous group was found to be better than the induced group (Apgar<8 in spontaneous – 1.3% in induced -2.6%).

Discussion

DISCUSSION

Labour is induced when delivery of the pregnancy will be of benefit to the health of the fetus or mother or both. Induction of labour excludes those situations were it is considered more expedient to maternal and or fetal safety and well being to deliver the pregnancy by caesarean section. The induction is justified when the benefits to either mother or fetus outweigh those of continuing the pregnancy. A general concept is the recognition that the induction is associated with increased complications as compared to spontaneous labour. This concept is the basis for the need for our study. Our study comprises of women who were relatively low risk.

This is a prospective study involving 300 patients. 150 women who went in for spontaneous labour and 150 women induced with prostaglandin E2 gel.

The patient characteristics like maternal age, gestational age, parity, mode of delivery, the need for oxytocin augmentation, the duration of first stage of labour and perinatal outcome was statistically analysed.

Patient's characteristics like maternal age and gestational age was statistically analysed though difference in maternal age in both groups significant statistically, the difference in age of patient by few months is not likely to affect the obstetric outcome. The mean maternal age was 24.7 in spontaneous group and 24.3 in induced group. This corresponds favourably to studies conducted by Johnson et al.

The gestational age at which patients were induced were higher than patients with spontaneous labour however the difference was very low and is statistically not significant. On an average most of the women entered into spontaneous labour at and around 38weeks. This is consistent with study by Robert L Goldenberg which shows black, Asian women delivery at 39 compared with American[44]. Considering parity with mode of onset of labour there was significantly higher parity in spontaneous labour groups. These results are in comparison to the study by Heffner et al. The maternal characteristics differed significantly among the groups with respect to the presence of antenatal complications like PIH, diabetes, GDM, PROM, postdatism, BOH etc. They were present in a significantly higher percentage in induced group.

It is well evident that women in spontaneous labour had higher chance of full term normal vaginal delivery than women in induced group.

Spontaneous Labour = 98.7% normal delivery and 1.3 % caesarean delivery.

Induced labour = 76.7% normal delivery and 23.3% caesarean delivery. Our finding of modest increase in caesarean delivery among women with induced labour is concurrent with the results of Heffner et al. He did observe that the caesarean delivery rate was 24.7% in induced nullipara's and 13.7% in spontaneous labour group. Among multipara's the caesarean rate was 4.5% in induced woman compared to 2.4% in spontaneous labour group. Failed induction being common indication for caesarean delivery in induced patients. Whereas foetal distress in spontaneous labour group. This goes to say that induction does not contribute significantly to fetal distress. This is in similar to the study by Johnson et al where failure to progress was the most common indication followed by fetal distress.

The mean duration of latent phase of labour is more in induced group (11.2) and the mean duration of latent phase of labour 4.8 in spontaneous group with the significant p value of less than 0.01. This is inconsistent to the findings of James et al who reported that the duration of first stage of labour was shorter in induction group than in the spontaneous group ie 6.0 vs 7.2 hours (p.005).

In patients with spontaneous labour the duration of active phase is shorter when compared to induced labour. The mean difference in multi among induced patients is higher in 3cm dilatation when compared to spontaneous group that is because of two patients who had abnormally prolonged labour one who went in for emergency LSCS because of deep transverse arrest and other vacuum due to failure of secondary maternal effort. Excluding those two patients the mean difference was more or less similar among two groups.

The third stage complication like postpartum haemorrhage was more in induced group than in spontaneous group, Whereas the study done by James et al showed no significant difference in both groups. The well-known maternal complications associated with induction of labour like fever, vomiting and hyper stimulation during the labour were found to be highly present in induced

labour groups than the spontaneous labour group. Of the 3 complications studied, vomiting was the most common side effect prevalent say 9.3% the induced group and 6.6% in spontaneous labour group.

The percentage of hyper stimulation was 0.2% in spontaneous labour group accelerated with oxytocin and 3.3% in induced women. None of the women in spontaneous group had fever. This is contradictory to the study by James et al where he found no difference in the occurrence of fever between the 2 groups.

Condition of the new born

All the babies were live born and there were no neonatal deaths. The mean birth weight of the babies in spontaneous group and that in groups induced were not statistically significant. The Apgar scores of the babies at 5 minutes in the spontaneous group was found to be better than the induced group (Apgar<8 in spontaneous – 1.3% in induced -2.6%).

Summary

SUMMARY

A Prospective study was conducted in PSG Hospital, Coimbatore in the department of obstetrics & gynaecology during the month of July 2011-December2011.

A total of 300 patients were taken into the study. Among them 150 patients were those who went into spontaneous progression & the other 150 included patients who were induced.

Various factors like maternal age, gestational age, parity, mode of delivery, duration of the latent & active phase, oxytocin augmentation & the perinatal outcome were compared between both these groups using a Performa.

In our study we found that patient gets in to spontaneous labour on an average around 38 weeks.

Latent phase of labour is prolonged in induced labour (mean duration 11.2 hrs.) compared to that of the spontaneous labour (mean duration 4.8 hrs.)

In patients with spontaneous labour the duration of active phase (mean duration 2.4 hrs.) was shorter when compared to induced labour (3.6 hrs.).

There was also increase in caesarean section rate in induced patients 23.3% compared to 1.3 % in spontaneous patients.

The perinatal outcome was studied using the Apgar scores. The Apgar scores of the babies at 5 minutes in the spontaneous group was found to be better than the induced group (Apgar<8 in spontaneous – 1.3% in induced -2.6%).

Finally we also conclude that spontaneous pregnancies cost effective compared to induced pregnancies.

Conclusion

CONCLUSION

As per the study patients gets in to spontaneous labour on an average around 38 weeks.

Latent phase of labour is prolonged in induced labour compared to that of the spontaneous labour.

In patients with spontaneous labour the duration of active phase was shorter when compared to induced labour.

There was also increase in caesarean section rate in induced patients 23.3% compared to 1.3 % in spontaneous patients.

The Apgar scores of the babies at 5 minutes in the spontaneous group were found to be better than the induced group.

Finally we also conclude that spontaneous pregnancies cost effective compared to induced pregnancies.

Statistical Analysis

STATISTICAL METHODS

The statistical package which is used for doing analysis is SPSS 16.0 version (statistical package for social sciences). The tools which are used for analysing raw data or ANOVA (analysis of variance) and cross tabulation.

REFERENCES

1. American College of Obstetrians and Gynaecologists. Induction of labour. ACOG Bulletin no. 10. Washington; DC; ACOG1998.
2. Speert H Obstetrics and Gynaecology in America; A history. Baltimore; Waverly Press 1980.
3. Muhlstein C, MoukengueL Lutringer G.Letravail induit: historique Rev. Fr.Gynecol Obstet 1986; 81: 507-508.
4. York R. The history of induction. Midlife Health Visist Community Nurse. 1984; 20(4): 109-116.
5. Fields H. Induction of labour: Its past, its present and its place. Postgraduate Med 1968; 44(3): 226-31.
6. Williams Obstetrics 21st edition pp 474.
7. David K James, Philips J. Steer, Carl P. Weiver, Bernard Gonil. High risk pregnancy 2nd edition, pp 1079-1080.
8. Fernando Arias. Practical guide to high risk pregnancy and delivery. Pp 397-399.

9. David K James, Philips J. Steer, Carl P. Weiver, Bernard Gonil. High risk pregnancy 2nd edition, pp 1090-1092.
10. Leung A, Kwok, Chang A. Association between prostaglandin E2 and placental abruption. British Journal of Obstetrics and Gynaecology 1987; 94: 1001-1002.
11. JM Beazley and A.R.L Weekes. Neonatal hyperbilirubinemia following the use of prostaglandin E2 in labour. British Journal of Obstetrics & Gynaecology 1976; 83: 62-67.
12. Helen A Allott, Christopher. Sweeping the membranes: a valid procedure in stimulating the onset of labour. British journal of Obstetrics & Gynaecology 1993; 100; 898-903.
13. S. Arul kumaran, S.S Ratnam. The effect of parity on uterine activity in labour. British Journal of Obstetrics & Gynaecology 1984; 91: 843-848.
14. D.M.F. Gibb, LD Cardozo, J.W.W stud. Outcome of spontaneous labour in multigravidae. British journal of obstetrics & Gynaecology 1982; 89; 708-711.

15. Janet E Bernnard, Andrew A Calder, Craig R Leiht. Recombinant human relaxation as a cervical ripening agent. British journal of Obstetrics & Gynaecology 1994; 104; 775-80.

16. Regine Ahner, Christian Egarter, Herbert Kiss, Fetal fibronectin a selection criterion for induction of term labour. American journal of Obstetrics & Gynaecology 1995; 173: 1513-1517.

17. Joseph Seit Chik, Janet Amino, Mario Castello, Oxytocin stimulation of dysfunctional labour. American Journal of Obstetrics & Gynaecology 1984; 150: 225-228.

18. Andrew J.Satin, Kenneth J.Leveno, Lynne Sherman. Factors affecting the dose response to oxytocin for labour stimulation. American Journal of Obstetrics & Gynaecology 1992;166: 1260-1261.

19. Ann M Miller, William F Rayburn. Patterns of uterine activity system intra vaginal prostaglandin E2 during preinduction cervical ripening. American Journal of Obstetrics & Gynaecology 1991; 165: 1006-1108.

20. Fereshteh, Ilan Timor, Conrad R Chao. Transvaginal ultrasonographic evaluation of the cervix before labour. Presence of cervical wedging is

associated with shorter duration of induced labour. American journal of Obstetrics and Gynecology 1994; 171: 1081-87.

21. Deborah A Wing, Ann Rahall, Margaret M Jones. Misoprostol an effective agent for cervical ripening and labour induction. American Journal of Obstetrics & Gynecology 1995; 172: 1811 – 1816.

22. Mackemize, Brine Castle. Transfer of prostaglandins to the fetus after prostaglandin E2 vaginal pessary administration. American Journal of Obstetrics & Gynecology 1989; 161: 920 – 923.

23. Geraldine Blanch, Karl Olah, Steve Walkinshaw. The presence of fetal fibronectin in the cervico vaginal secretions of at term. Its a role in the assessment of women before labour induction in the investigation of the physiologic mechanism of labour. . American Journal of Obstetrics & Gynecology 1996; 174: 262 –266.

24. Naxem Jagan, Harold Schulman. The predictability of labour outcome from a comparison of birth weight and x-ray pelvimetry. . American Journal of Obstetrics & Gynecology 1981; 139: 501 – 511.

25. Anna Ritta, Robert Romero. Oxytocin secretion and human parturition: pulse frequency and duration increase during spontaneous labour in women. . American Journal of Obstetrics & Gynecology 1991; 165: 1515 – 1523.

26. Varakshi R. Germian. Randomized controlled trial of vaginal misoprostol and intracervical PGE2 gel for induction of labour at term. . American Journal of Obstetrics & Gynecology 1995; 85: 541 –4.

27. S.Stampe Sorensen, V. Brocks, Lenstrup. Induction of labour and cervical ripening by intracervical PGE2. Ostetrics & Gynecology 1985; 65: 110 – 114.

28. Beth A. Brindley, Robort J. Sokol. Induction and augmentation of labour. Basis and methods of current practice. Obstetrics & Gynecological survey 1988; 43: 730-741.

29. Jeffry L Echer, Katherine T Cher. Increased risk of caesarean delivery with advancing maternal age. . American Journal of Obstetrics & Gynecology 2001; 185: 883 – 887.

30. Sascha Dublin, Mona Hydon – Rochelle, Robert C. Kaplan et al. Maternal and neonatal outcomes after induction of labour without an identified induction. . American Journal of Obstetrics & Gynecology 2000; 183: 986 – 991.
31. Barbare P. Yawn, Peter Wollan, Kenaherly MC. Keon. Temporal changes in rates and reasons for medical induction of term labour. . American Journal of Obstetrics & Gynecology 2001; 184: 611 – 619.
32. Bishop C.H. Elective induction of labour. Obstetrics & Gynecology 1955; 5: 519 – 27. 11
33. Calkins LA, Irvine JH, Horsery. Variation in the length of labour. American Journal of Obstetrics & Gynecology 1930; 19: 294 – 7.
34. Burneth JE, The induction scoring: An objective approach to induction of labour. Obstetrics & Gynecology 1966; 28: 479.
35. Prysax M, Castronova FC. Elective induction versus spontaneous labor. A case control analysis of safety and efficacy. The Journal of Obstetrics & Gynecology 1998; 92: 47 – 52.

36. Dean V. Coorod, Fearl JD, Prins RP. Epidemiology of labour induction. American Journal of Obstetrics & Gynecology 2000; 182: 1355 – 1362.

37. James A. Macer, Cynthia L. Macer and Linda S. Chan. Elective induction versus spontaneous labour A retrospective study of complications and outcome. American Journal of Obstetrics & Gynecology 1992; 166: 1690 – 1697.

38. Arthur S.Maslow, Amy L. Sweeny. Elective induction of labour as a risk factor for Cesaeran delivery among low risk women near term. Obstetrics & Gynecology 2000; 95: 917 – 922.

39. Seyb ST, Berka RJ, Socol ML et al. Risk of Cesarean delivery with elective induction of labour at term in nulliparas. Journal of Obstetrics & Gynecology 1991; 180: 620.

40. Yeast JD, Jones A, Porkin M. Induction of labour and relationship to caesarean delivery – A review of 7001 consecutive inductions. American Journal of Obstetrics & Gynecology 1999; 180: 620.

41. Glaucia Virginia gueura et al;elective induction versus spontaneous labour in latin America.Bulletin of WHO 2011;89:657 – 665.

42. GlantZ Jc ,J Repord med elective induction versus spontaneous labour associated outcome.2005 Apr;50(4):235 – 40.

43. Macer JA,macer CL,Chan Ls.Elective induction versus spontaneous.dept Am J obs & gyn 1992 june ; 166 (b pt1):1690 – 6;discussion 1696 -7.

44. Robert L Goldenberg and Jennifer F Culhan, Indian Journal of epidemiology Vol 1; 107-133.

Master Chart

164	21	I110172324	Primi	39		Spontaneous	3	Yes	5	10	NVD	2.63
165	32	I11017433	Primi	40.2		Spontaneous	2	No	2	2	NVD	2.8
166	28	I11017393	Multi	39.2		Spontaneous	2	No	3	6	NVD	2.7
167	25	I11017266	Multi	38		Spontaneous	3	No	4	3	NVD	3.1
168	30	I11017037	Multi	38.6		Spontaneous	3to4	No	4	4	NVD	3.8
169	26	I11016878	Multi	39.6		Spontaneous	3	No	3	4	NVD	3.14
170	28	I11017258	Multi	40.2		Spontaneous	4	No	3	1.5	NVD	3
171	31	I11016839	Primi	39.2		Spontaneous	2.5	No	2	2.5	NVD	3.6
172	21	I11017129	Primi	40		Spontaneous	2.5	No	1	4	NVD	2.48
173	30	I11017233	Primi	40.2		Spontaneous	2	No	8	1	NVD	3.1
174	25	I11016993	Primi	39.1		Spontaneous	2.5	No	4	1	NVD	3.4
175	27	I11016595	Primi	38.6		Spontaneous	3	No	3	2	NVD	3.17
176	24	I11016626	Primi	38.1		Spontaneous	5	No	4	1	NVD	3.5
177	22	I11016768	Primi	39.1		Spontaneous	3	No	6	3	NVD	2.9
178	19	I11018762	Primi	38.2		Spontaneous	3	No	4	3.3	NVD	3.2
179	29	I11012303	Primi	39.2		Spontaneous	2	Yes	5	2	NVD	2.85
180	20	I11018655	Primi	39		Induced	1finger	Yes	24	-	Emergency LSCS	3.15
181	21	I11016824	Multi	38.6		Induced	1.5	No	6	2	vaccum delivery	3.03
182	30	I11017044	Multi	39		Induced	1	No	14	1	NVD	3.15
183	25	I11017207	Multi	39		Induced	3	Yes	2	11	NVD	3.3
184	27	I11018659	Multi	39.1		Induced	1.5	No	3.5	0.5	NVD	2.6
185	24	I11018663	Multi	40		Induced	2	No	7	3	NVD	3.54
186	22	I11018731	Multi	40.6		Induced	1	Yes	12	7	NVD	2.9
187	19	I11018470	Multi	39.5		Induced	3	Yes	5	11	NVD	3.3
188	29	I11018444	Primi	39		Induced	1	No	7	1.5	vaccum delivery	2.45
189	20	I11018380	Primi	39.6		Induced	1.5	No	3.5	1	NVD	2.95
190	21	I11018302	Primi	41.2		Induced	3	Yes	12	7	NVD	
191	26	I11018101	Primi	38.6		Induced	1	No	5.5	2	NVD	2.61
192	23	I11000471	Primi	40		Induced	1	Yes	17	4	NVD	3
193	20	I11O53073	Primi	37		Induced	1	No		-	Emergency LSCS	1.95
194	25	I11015044	Primi	40		Induced	2.5	No	7	1	NVD	2.7
195	29	I11014699	Primi	38		Induced	1	Yes	1	2	NVD	3.4
196	20	I11014555	Primi	40.1		Induced	1	Yes	19	2	vaccum delivery	2.9
197	25	I11028448	Primi	37		Induced		Yes	24	-	Emergency LSCS	3
198	23	I11028762	Primi	37.4		Induced	1	Yes	16	1	NVD	2.25
199	19	I11015751	Multi	39		Spontaneous	4	No	5	1	NVD	2.7

200	29	I11028360	Primi	38		Induced		No		-	Emergency LSCS	2.82
201	20	I11027950	Primi	40.2		Induced	1	Yes	8	3	vaccum delivery	2.9
202	21	I11027571	Primi	37		Induced	2	Yes	10	2	NVD	2.4
203	26	I11027896	Primi	37		Induced	1.5	Yes	14	6	vaccum delivery	2.64
204	23	I11027726	Primi	40		Induced	1	No	6	3	vaccum delivery	3.32
205	20	I11027495	Primi	38.3		Induced	1	Yes	6	4	NVD	2.82
206	25	I11027359	Primi	37.6		Induced	2	No	6	1.4	NVD	2.82
207	29	I11026437	Primi	40		Induced	1	Yes	6.5	3	NVD	3.27
208	20	I11026472	Primi	40.1		Induced	1	No	48	2	NVD	3.12
209	25	I11026432	Primi	38		Induced	2	Yes	19	4	vaccum delivery	2.36
210	23	I11026433	Multi	40.1		Induced	1finger	No		-	Emergency LSCS	3.3
211	24	I11014250	Multi	38.4		Induced	1	No	6	5.5	NVD	2.8
212	25	I1105021	Primi	38.5		Induced	1	No	24	2.5	NVD	2.31
213	28	I11015571	Primi	38.4		Induced	2	No	8	5	NVD	2.78
214	20	I11016480	Primi	40.5		Induced		No		-	Emergency LSCS	3.2
215	21	I11017279	Primi	38.1		Induced	1.5	Yes	8	6.5	NVD	2.44
216	24	I11015382	Primi	37.4		Induced	2	Yes		-	Emergency LSCS	3.52
217	25	I11017422	Primi	38.4		Induced	1	No	7	1	NVD	2.8
218	28	I11017604	Primi	40		Induced	2	No	6	1.5	NVD	2.9
219	20	I11025476	Primi	40		Induced	1	Yes	18	5	NVD	2.36
220	19	I11026119	Primi	37.1		Induced	1	Yes	12	8	NVD	2.25
221	20	I11027865	Primi	38.4		Induced	2	Yes		-	Emergency LSCS	2.3
222	29	I11014666	Primi	38.1		Induced	1	Yes	24	7	NVD	2.6
223	29	I11017263	Primi	39.6		Induced	1	Yes	24	4	NVD	2.05
224	18	I11017173	Primi	39.6		Induced	2	Yes	6	1	NVD	2.6
225	26	I11017191	Primi	38.6		Induced	2	No	12	4	vaccum delivery	2.8
226	26	I11004575	Primi	40		Induced	2	Yes	8	10	NVD	2.8
227	21	I11004572	Primi	39.5		Induced	1	No	5	6	vaccum delivery	2.9
228	23	I11000612	Primi	40.1		Induced	1	Yes	12	10	NVD	2.9
229	31	I11015311	Multi	40.4		Induced	1	Yes	7	6	NVD	3.32
230	24	I11016655	Multi	38.3		Induced	2	Yes	7	5	NVD	2.5
231	21	I11017050	Multi	39.3		Induced	2	No	3.15	0.5	NVD	2.7
232	20	I11015612	Multi	39.6		Induced	1	No	16	4	vaccum delivery	3.2
233	21	I11019604	Multi	40.3		Induced	2	Yes	16	2	NVD	2.8
234	30	I11017039	Multi	40.3		Induced	1	No	24	6	NVD	3.2
235	20	I11020559	Multi	37.1		Induced	1	Yes	10	4	NVD	2.6

236	21	I11019059	Multi	39.4		Induced	2	Yes	8	1	vaccum delivery	3.2
237	30	I11018713	Primi	39.3		Spontaneous	2	No	2.5	2	NVD	3.23
238	19	I11008874	Primi	36.3		Spontaneous	2	Yes	6	3	NVD	2.22
239	24	I11016457	Primi	36.2		Spontaneous	3	No	8	5	NVD	2.88
240	22	i11015332	Primi	40.1		Spontaneous	5	No	8	0.45	NVD	2.9
241	28	I11016269	Primi	38.4		Spontaneous	5to6	No	2	1	NVD	3.36
242	20	i11009047	Primi	39.1		Spontaneous	4	No	4	2.5	NVD	3.1
243	17	I11008709	Primi	36.2		Spontaneous	3	No	6	6	NVD	2.32
244	22	I11009196	Primi	39		Spontaneous	6to7	No	6	0.45	NVD	2.53
245	32	I1101738	Multi	36.3		Spontaneous	3	Yes	4	8	NVD	3.52
246	24	I11019372	Primi	37.9		Spontaneous	6to7	No	6	1	NVD	2.45
247	21	I11020947	Primi	39.4		Spontaneous	3to4	Yes	3	3	NVD	2.8
248	18	I11018032	Primi	37.5		Spontaneous	6to7	No	8	1	NVD	2.48
249	26	I11017992	Primi	37.1		Spontaneous	3	Yes	7	4	NVD	2.74
250	21	I11017764	Primi	39		Spontaneous	4	No	6	2	NVD	4
251	24	I11017307	Primi	38.3		Spontaneous	2	No	5	2	NVD	2.73
252	27	I11017258	Primi	39.1		Spontaneous	2to3	No	5	4	NVD	2.5
253	27	I11017725	Primi	39.5		Spontaneous	3to4	Yes	4	3	NVD	2.8
254	24	I11016591	Primi	38		Spontaneous	3	No	2.5	3	NVD	2.84
255	25	I11016871	Primi	39.2		Spontaneous	2	No	5	2	NVD	3.1
256	26	I11016016	Multi	37.5		Spontaneous	2	Yes	6	6	NVD	2.7
257	25	I11016072	Multi	40.1		Spontaneous	3	No	4	1	NVD	3
258	27	I11016299	Primi	37.3		Spontaneous	2	No	6	2	NVD	2.3
259	17	I11010230	Primi	37		Spontaneous	5to6	Yes	14	3	NVD	2.4
260	29	I11008327	Primi	39.4		Spontaneous	3	No	8	4	NVD	3.4
261	26	I11017270	Primi	38		Spontaneous	3	No	4.5	1	NVD	3.16
262	36	I11016839	Primi	39.5		Spontaneous	2	No	3.5	0.5	NVD	3.17
263	27	I11009317	Primi	39.1		Spontaneous	2	No	4.5	1.5	NVD	2.54
264	29	I11009272	Primi	39.1		Spontaneous	2	No	6.5	3.5	NVD	2.59
265	26	I11009268	Primi	39.5		Spontaneous	2	No	2	1.5	NVD	3.2
266	36	I11008031	Primi	37		Spontaneous	4	No	2	1	NVD	2.81
267	27	I11009257	Primi	39.3		Spontaneous	3	No	5	3	NVD	2.78
268	20	I11020774	Primi	37		Spontaneous	2	No	12	2.5	NVD	2.6
269	19	I11008675	Primi	38		Spontaneous	3	No	2.5	7	NVD	2.73
270	25	I11009076	Primi	38.6		Spontaneous	4	No	8	4.5	NVD	2.9
271	23	I11005786	Primi	39.2		Spontaneous	3	No	3.5	7	NVD	2.6

272	27	I11009004	Primi	39.1		Spontaneous	4	No	5	3	NVD	3.26
273	29	I11002298	Primi	38.5		Spontaneous	4to5	No	1	0.5	NVD	3.9
274	23	I11003073	Primi	38		Spontaneous	4	No	2	2	NVD	
275	26	I11014880	Multi	38.4		Spontaneous	7	No	3	0.5	NVD	3.1
276	26	I11015000	Multi	39.4		Spontaneous	3	No	6	1.5	NVD	2.69
277	24	I11015095	Multi	39.2		Spontaneous	3	No	2	4	NVD	2.8
278	27	I11014847	Multi	37.3		Spontaneous	2	No	4	4	NVD	2.6
279	23	I11015034	Multi	38		Spontaneous	2.5	Yes	2.5	8	NVD	2.78
280	25	I11015208	Multi	38		Spontaneous	2	No	4	2	NVD	2.4
281	28	I11016543	Multi	39.1		Spontaneous	3	No	3	1	NVD	3.2
282	21	I11017725	Multi	40		Spontaneous	4	No	6	2	NVD	3.2
283	22	I11017772	Multi	39.1		Spontaneous	3	No	1	3	NVD	3.6
284	26	I11017334	Primi	39		Spontaneous	2	No	10	1.5	vaccum delivery	2.7
285	24	I11017602	Primi	39.5		Spontaneous	6	No	3	1.5	NVD	2.25
286	25	I11018060	Primi	38.5		Spontaneous	3	No	6	2	NVD	2.9
287	18	I11018051	Primi	36.4		Spontaneous	5	No	5.5	4	NVD	2.7
288	24	I11018031	Primi	38.4		Spontaneous	1	No	4	1	NVD	2.3
289	34	I11018099	Primi	38.6		Spontaneous	2	No	6	2	NVD	3.4
290	24	I11017980	Primi	38.4		Spontaneous	3	No	6	3	NVD	3.6
291	26	I11018100	Primi	39		Spontaneous	1.5	No	4	1	NVD	2.6
292	21	I11017749	Primi	40.2		Spontaneous	3	No	6	2.5	NVD	2.9
293	23	I11017439	Primi	37.4		Spontaneous	3	No	4	4	NVD	2.32
294	23	I11017549	Primi	39		Spontaneous	4	No	6	1	NVD	2.45
295	21	I11017764	Multi	39.4		Spontaneous	3	No	4	3.5	NVD	3.14
296	28	I11001223	Primi	37.6		Spontaneous	6	No	3	0.45	NVD	2.6
297	24	I11000682	Primi	39.1		Spontaneous	2	No	5.5	2	NVD	2.9
298	21	I11000762	Primi	38.3		Spontaneous	1	No	4	1	NVD	2.46
299	23	I11000682	Primi	38.3		Spontaneous	2	No	3	2.5	NVD	2.9
300	26	I11000762	Primi	37.5		Spontaneous	4	No	3	4	NVD	2.32

PRO FORMA

NAME

FATHERS NAME

AGE

SNO

OP NO

IP NO

ADDRESS

UNIT

SOCIO ECONOMIC STATUS

MENSTURAL HISTORY

OBSTETRIC HISTOY

DIAGNOSIS

INDICATION FOR INDUCTION

ON EXAMINATION

TEMPERATURE

PULSE RATE

BP

ANAEMIA

ICTERUS

EDEMA

CVS

RS

P/A

Uterine height

Presenting part

FH

MODE OF ONSET OF LABOUR

Date

Time

P/V

Factors	0	1	2	3
Dilatation	Closed	1-2	3-4	>5
Effacement	25	50	75	>80
Consistency	Firm	MED	SOFT	-
Position	Post	MID	ANT	-
Station	-3	-2	-1,0	+1,+2
Total		FAVOURABLE	UNFAOURABLE	

Bishop scoring is assessed

REASSESMENT PV Findings

Augmentation with ARM and oxytocin

- Duration of Latent Phase
- Duration of Active Phase

MODE OF DELIVERY

INDICATION

ANY SIDE EFFECTS

MATERNAL COMPLICATION

BABY DETAILS

Sex

Weight

APGAR

Time